Can CSCs cause relapse? Is that relapse sensitive or acquired?

(a) Sensitive + resistant cells --> treat with chemotherapy --> only resistant cells remain --> relapse comprises only cells resistant to the chemotherapy as they originate from the population of chemoresistant cells

(b) Cancer stem cells give rise to sensitive tumour cells --> because CSCs are very slow dividing, they won't be killed off quite so much as the tumour cells, during chemotherapy --> during relapse, chemosensitive cells arise again and can be treated with chemotherapy but can never fully get rid of all the CSCs

(c) In reality it is a combination of both. CSCs + resistant populations --> chemotherapy --> resistant and sensitive cells in the next tumour outbreak --> resistant cells do better with each round of chemo because they are better suited to that environment

Epigenetics of acquired resistance

- Bivalent chromatin are segments of DNA, bound to histone proteins, that have both repressing and activating epigenetic regulators in the same region
- These activators work to enhance or silence the expression of genes
- The most common antagonistic epigenetic regulators found together on bivalent chromatin domains are methylated marks on H3K4 (allows the gene to be activated when needed) and H3K27 (silences the gene)